

**WHAT IS CLAIMED IS:**

1                   1.        A method of repairing a valve in a patient's body, the valve having a  
2   plurality of movable leaflets, the leaflets having a superior surface on a first side and an  
3   inferior surface on an opposing side, the method comprising:

4 positioning a coaptation device near the valve, the coaptation device having a pair  
5 of movable arms,

6 engaging the inferior surfaces of the leaflets with the arms;

7 manipulating the arms to hold the leaflets in a coapted position in  
8 which at least portions of the superior surfaces face each other; and

implanting the coaptation device in the patient's heart to maintain the leaflets in the coapted position.

1                           2.     The method of claim 1 further comprising engaging the superior  
2     surfaces of the leaflets before moving the arms to the closed position.

1                           4.       The method of claim 3 wherein the leaflets are pinched between the  
2       superior elements and the arms.

1                           7.       The method of claim 1 wherein the coapting device is releasably  
2   coupled to a flexible shaft adapted for positioning through a blood vessel, and wherein the  
3   coapting device is implanted by releasing the coapting device from the flexible shaft.

1                   9.     The method of claim 1 wherein the leaflets are not penetrated by the  
2     arms.

1                   10.    The method of claim 1 wherein the valve is in the patient's heart.

1                   11.    The method of claim 10 wherein the valve is the mitral valve.

1                   12.    The method of claim 11 wherein the positioning the coapting device  
2     comprises introducing the coapting device through the interatrial septum into the left atrium.

1                   13.    Apparatus for repairing a valve in a patient's body, the valve having a  
2     plurality of movable leaflets, the leaflets having a superior surface on a first side and an  
3     inferior surface on an opposing side, the apparatus comprising:

4                   a pair of arms coupled together and movable from an open position in which  
5     portions of the arms are spaced apart to a closed position in which the portions of the arms  
6     are closer together, the arms being configured to engage the inferior surfaces of the leaflets  
7     and hold the leaflets in a coapted configuration in which portions of the superior surfaces are  
8     facing each other;

9                   wherein the arms are implantable in the patient's body to maintain the leaflets  
10    in the coapted configuration.

1                   14.    The apparatus of claim 13 further comprising a central member, the  
2     arms being movably coupled to the central member.

1                   15.    The apparatus of claim 14 wherein the arms are configured to clamp  
2     the leaflets between the arms and the central member in the closed position.

1                   16.    The apparatus of claim 14 wherein the central member is configured to  
2     be positioned through the valve between the leaflets.

1                   17.    The apparatus of claim 14 wherein the central member is detachably  
2     coupled to a shaft adapted for delivering the arms into the heart.

1                   18.    The apparatus of claim 17 further comprising a pair of superior  
2     elements movably coupled to the shaft, the superior elements being configured to engage the  
3     superior surfaces whereby the leaflets may be pinched between the arms and the superior  
4     elements.

1                   19. The apparatus of claim 18 wherein the superior elements are coupled  
2 to a conduit slidably coupled to the shaft.

1                   20. The apparatus of claim 18 wherein the superior elements are resiliently  
2 biased into an extended configuration in which portions of the superior elements are spaced  
3 apart from the shaft for engaging the superior surfaces of the leaflets.

1                   21. The apparatus of claim 13 wherein the arms have engaging surfaces for  
2 engaging the inferior surfaces of the leaflets without penetration thereof.

1                   22. The apparatus of claim 21 wherein the engaging surfaces have a  
2 texture or teeth for enhancing friction.

1                   23. The apparatus of claim 17 wherein the shaft is flexible and configured  
2 for positioning through a blood vessel into the heart.

1                   24. The apparatus of claim 23 wherein the shaft, arms and central member  
2 are slidably positionable through an endovascular sheath.

1                   25. A method of repairing a valve in a patient's body, the valve having a  
2 plurality of movable leaflets, the method comprising:

3                   positioning a coaptation device near the valve, the coaptation device having a  
4 grasping element;

5                   atraumatically grasping the leaflets with the grasping element to at least  
6 partially immobilize the leaflets relative to each other; and

7                   implanting the coaptation device in the patient's body, wherein the leaflets are  
8 not penetrated by the coaptation device.

1                   26. The method of claim 25 wherein the grasping element has a pair of  
2 opposing non-penetrating surfaces for pinching the leaflets therebetween.

1                   27. The method of claim 26 wherein the grasping element has a pair of  
2 movable jaws, the non-penetrating surfaces being disposed on the movable jaws.

1                   28. The method of claim 25 wherein the leaflets have a superior surface on  
2 a first side thereof and an inferior surface on an opposing side thereof, and wherein the  
3 grasping element atraumatically engages the inferior surfaces of the leaflets.

1                   29.    The method of claim 28 wherein the coaptng device is implanted with  
2 at least portions of the superior surfaces of the leaflets generally facing each other.

1                   30.    The method of claim 28 wherein the grasping element comprises a pair  
2 of movable arms, wherein the leaflets are immobilized by engaging the inferior surfaces and  
3 pinching the leaflets together with the movable arms.

1                   31.    The method of claim 30 further comprising atraumatically engaging  
2 the superior surfaces of the leaflets with a pair of superior elements.

1                   32.    The method of claim 25 further comprising applying energy to the  
2 leaflets before implanting the coaptng device.

1                   33.    The method of claim 32 wherein the energy is applied to fuse at least  
2 portions of the leaflets together.

1                   34.    The method of claim 25 wherein the valve is in the heart.

1                   35.    The method of claim 34 wherein the valve is the mitral valve.

1                   36.    The method of claim 35 wherein positioning the coaptng device  
2 comprises introducing the coaptng device through interatrial septum into the left atrium.

1                   37.    The method of claim 34 wherein positioning the coaptng device  
2 comprises endovascularly positioning the coaptng device through a blood vessel into the  
3 heart.

1                   38.    Apparatus for repairing a valve in a patient's body, the valve having a  
2 plurality of movable leaflets, the apparatus comprising:

3                   a delivery device; and

4                   a grasping element releasably coupled to the delivery device and configured to  
5 atraumatically grasp the leaflets to immobilize at least a portion of the leaflets relative to each  
6 other, the grasping element being implantable in the patient's body to hold the leaflets in a  
7 coapted configuration without penetrating the leaflets.

1                   39.    The apparatus of claim 38 wherein the leaflets have a superior surface  
2 on a first side thereof and an inferior surface on an opposing side thereof, and the grasping

3 element comprises a pair of arms coupled together and movable from an open position in  
4 which portions of the arms are spaced apart to a closed position in which the portions of the  
5 arms are closer together, the arms being configured to engage the inferior surfaces of the  
6 leaflets and hold the leaflets in a coapted configuration in which portions of the superior  
7 surfaces are facing each other.

1 40. The apparatus of claim 39 wherein the grasping element has a pair of  
2 superior elements for engaging the superior surfaces of the leaflets.

1 41. The apparatus of claim 38 wherein the grasping element has a pair of  
2 opposing non-penetrating surfaces for pinching the leaflets therebetween.

1 42. The apparatus of claim 38 wherein the grasping device has a pair of  
2 movable jaws, the non-penetrating surfaces being disposed on the movable jaws.

1 43. The apparatus of claim 37 wherein the delivery device comprises a  
2 catheter shaft configured for endovascular positioning through a blood vessel.

1 44. A system for repairing a valve in a patient's body, the valve having a  
2 plurality of movable leaflets, the system comprising:

3 a grasping element configured to atraumatically grasp the leaflets to  
4 immobilize at least a portion of the leaflets relative to each other; and

5 means for fastening at least a portion of the leaflets together without  
6 penetrating the leaflets.

1 45. The system of claim 44 wherein the fastening means comprises a clip.

1 46. The system of claim 44 wherein the fastening means comprises a  
2 device for delivering energy to the leaflets.

1 47. The system of claim 46 wherein the energy is selected from  
2 radiofrequency, laser, microwave, or ultrasonic energy.

1 48. The system of claim 44 further comprising an endovascular catheter,  
2 the grasping element being coupled to the endovascular catheter.

1 49. The system of claim 48 wherein the fastening means is coupled to the  
2 endovascular catheter.

1                   50.    The system of claim 44 wherein the grasping element forms at least  
2 part of the fastening means.

1                   51.    A method of repairing a valve in a patient's body, the valve having a  
2 plurality of movable leaflets, the method comprising:  
3                   atraumatically grasping the leaflets;  
4                   immobilizing at least a portion of the leaflets relative to each other; and  
5                   fastening the leaflets together without penetrating the leaflets.

1                   52.    The method of claim 51 wherein fastening the leaflets comprises  
2 applying a clip to the leaflets.

1                   53.    The method of claim 51 wherein fastening the leaflets comprises  
2 delivering energy to the leaflets.

1                   54.    The method of claim 53 wherein the energy is selected from  
2 radiofrequency, laser, microwave, or ultrasonic energy.

1                   55.    The method of claim 51 wherein the grasping, immobilizing and  
2 fastening of the leaflets is performed using endovascular devices.

1                   56.    The method of claim 51 wherein grasping, immobilizing and fastening  
2 of the leaflets is performed using the same device.

1                   57.    The method of claim 56 wherein the device is implantable.

1                   58.    The method of claim 51 wherein the valve is in the heart.

1                   59.    The method of claim 58 wherein the valve is the mitral valve.